SPECTRAPURE 5300

Room Air Purifier

Installation & Operation Manual

SPECTRA GASES

ONE YEAR LIMITED WARRANTY

The manufacturer, warrants this product to be free from defects in materials, workmanship, and design for a period of one year from date of shipment to the purchaser. Improper handling may void warranty.

Except for the factory-based warranty set forth above, the manufacturer makes no express warranties. In no event will the manufacturer be liable for indirect or consequential damages of any nature whatsoever. Modifications or repairs performed on equipment without prior written approval from the manufacturer may invalidate the warranty.

For Customer Service Call or Write the Manufacturer or a qualified Manufacturer's Representative:

Spectra Gases, Inc.

1-(800) 932-0624

3434 Route 22 West
Branchburg, NJ 08876 U.S.A
FAX: (908)252-0811

DAMAGE DURING SHIPMENT

FOR YOUR PROTECTION

The carrier who delivers merchandise to your door is responsible for loss and damages. Check your merchandise carefully for shipping damage before accepting delivery from the carrier. Examine the external shock watch label on the carton to determine whether severe shock has occurred during transit. When you accept the shipment from the transportation company, you are acknowledging that the articles were delivered to you in good condition and were properly packed.

Here is how to handle damages and shortages.

Visible Damage

1. Have delivery person note on Freight Bill the nature and extent of damages.
2. Notify the Transportation Company's office to inspect the merchandise.
3. File claim for damages at once. In filing a claim with the Transportation Company, you may (a) make a cash adjustment for full value; (b) arrange to have repairs made, or (c) replace the merchandise.

Concealed Damage

1. If damage is noticed when merchandise is unpacked, notify Transportation Company's office immediately and ask to have it inspected.
2. Do not destroy packing materials until shipment is inspected and claim settled.

Shortages

1. All shortages must be reported within ten (10) days.
2. Check number of cartons delivered with the quantity shown on your receipt.
3. If quantities do not tally, have driver note shortage and if missing items do not show up in a few days, advise us and we will reship.

Important

All claims for loss or damage should be filed immediately with the Transportation Company making delivery to your door. Then notify us. We will mark our records accordingly. Should you need assistance with the claim, we will be glad to help.

Note: Do not return damaged merchandise as transportation company will pick it up after settling claim.

IMPORTANT

RETURN GOODS CANNOT BE RETURNED WITHOUT WRITTEN AUTHORITY

Call or write for return goods authorization number. All shipments not having this number will be refused. All shipments returned for credit or exchange when the error is not ours will be subject to restocking charges. Material must be returned freight prepaid.

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SECTION 1 – INTRODUCTION

The SGI SpectraPure Model No. 5300 Room Air Purifier functions as a component of the SpectraPure 5300 Air Purification System. The purifier is intended to remove the toxicity of halogen gases and halogen gas compounds that may be present in laser room air in the event of an accidental release of the excimer laser gas mix. The SpectraPure 5300 Air Purifier was designed to reduce toxic gas contamination to safe levels in the average sized laser surgery room. Should the laser room air accidentally become contaminated with excimer laser gas mix, all personnel should immediately evacuate the room. The Air Purifier can be remotely or automatically actuated, depending on the purchase option. The purifier uses a high flow blower to circulate room air through an activated charcoal filter. The purifier draws contaminated air into the lower intake grill and then through the filter compartment. The halogen and halogen compounds are removed by the filter and purified air is exhausted through the top grill on the unit. For proper operation, the purifier requires unrestricted air flow at the inlet and the outlet. The purifier is designed for easy operation and can be manually turned On or Off. As an optional configuration, the Air Purifier can be mated to the SGI Model No. 215 Gas Cylinder Storage Cabinet for the purpose of ventilating the cabinet. The SpectraPure 5300 System can also be equipped with the SGI Series 6400 Gas Detector. The detector may be used to automatically turn on the Air Purifier at factory set ppm levels. The detector may also be used to monitor room air quality conditions.

1.2 – IMPORTANT SAFEGUARDS

When using the SpectraPure Model 5300 Room Air Purifier, always follow these basic safety precautions:

1. Read these instructions completely before installing or using the purifier.
2. Attach the power cords to appropriately rated and grounded plugs. Keep the cords away from hot surfaces. Never ground them to a gas pipe or water pipe.
3. Take precautions to insure that safe and adequate wiring is installed in observance of all pertinent local electrical codes. **WARNING: The SpectraPure 5300 must be supplied with uninterrupted wall voltage and left in Standby Mode (see Section 4.2.1) in order to insure activation in the event of an accidental release of excimer laser gas into the laser surgery room air.**
4. Do not disassemble the equipment, or try to repair it yourself without first checking with a manufacturer's representative. **CAUTION: Risk of electric shock. Service access panels should be removed only by qualified servicing personnel.**
5. Since line voltage is present in the purifier during operation, it is recommended that proper caution is observed and that all panels be mounted on the purifier while operating.
6. Turn OFF the MAIN Circuit Breaker ON/OFF Switch and unplug the purifier power cord when servicing the purifier, (the purifier is shipped from the factory with the MAIN switch turned OFF).

WARNING: The MAIN Circuit Breaker must be in the "I" (on) position in order to enable a STANDBY ready condition to exist and to allow the air purifier to respond properly in the event of an accidental release of toxic gas into room air.

7. Complete proper installation in accordance with Section 3 of this manual with proper clearances in the rear, in the front, and on top of the equipment.
8. Do not install the Air Purifier in a room larger than 3000 cubic feet without making additional provisions for purifying room air. Maximum recommended room air volume processing capacity of the SpectraPure 5300 Air Purifier is 1750 cubic feet. Room dimensions should be rectilinear or square shaped, see Section 2.4.2.
9. **Do not obstruct air flow to Air Purifier intake or exhaust vents.**
10. Take precaution to prevent facility supplied HVAC air flow from competing with SpectraPure Purifier air flow during operation. In addition to impeding air purification, HVAC air intake vents may draft toxic fumes into other areas of the medical facility.
11. Install the SpectraPure 5300 in direct proximity of gas storage cylinders and the laser surgery device. Use only properly rated SGI medical laser gas cylinders. Use of any other gas cylinders may nullify warranty coverage and could create a severe safety hazard. Do <u>not</u> re-locate equipment without contacting SGI for technical assistance.

12. Do not operate the purifier if any part of it is damaged, or if any part has been dropped, until you have it checked by a qualified service technician.

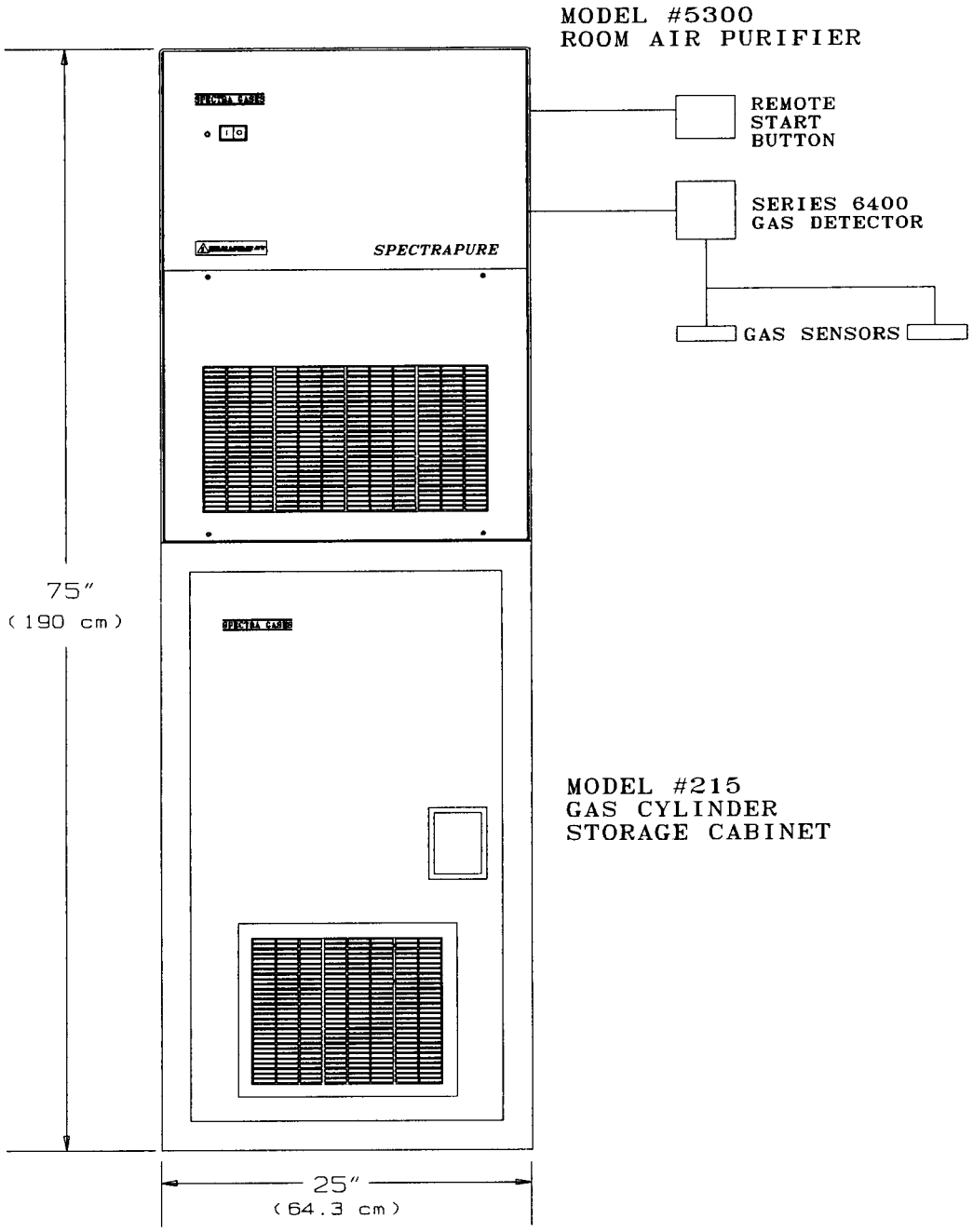
NOTICE OF CAUTION AND WARNING

The Seller herein informs the Buyer that there are hazards associated with the use of compressed halogen gases, and that proper provison must be taken to insure the safe handling of these gases. The SpectraPure 5300 Air Purifier is intended to function only as a component of a halogen gas handling system. This system must include whatever equipment, facilities and procedures as may be necessary to comply with all pertinent ordinances and safety codes.

By installing and using the SpectraPure 5300 Air Purifier, the Buyer accepts full responsibility for the proper installation and use of this product.

FIGURE 1.3 – SPECTRAPURE MODEL 5300 ROOM AIR PURIFIER

WITH FULL EQUIPMENT OPTIONS



SECTION 2 – THEORY OF OPERATION

2.1 – SUMMARY

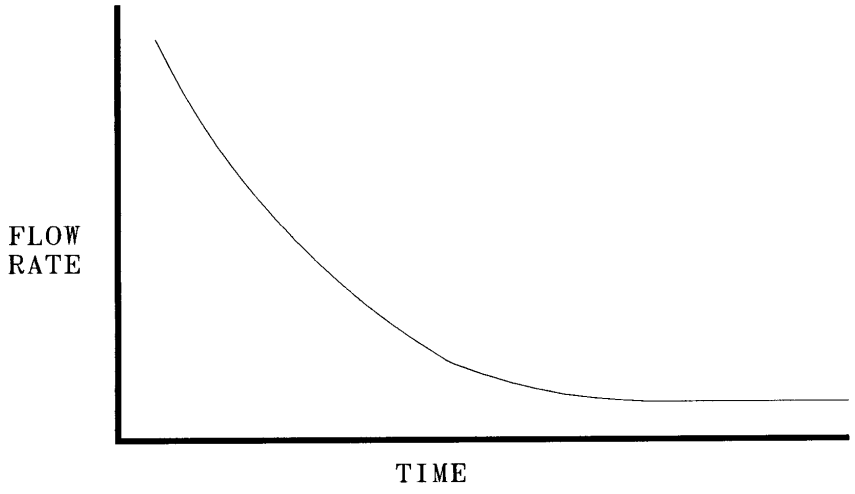
The SpectraPure Model 5300 Room Air Purifier is an air cleaning device that is specifically designed for use with excimer laser-based medical equipment. Excimer lasers produce very short wavelength ultraviolet light by stimulating the emission of radiation from a lasing medium containing a specific mixture of rare gases (such as Argon, or Xenon) and halogen gases (such as Fluorine, or Chlorine). The halogen gases, though used in very small quantities, are very chemically reactive, and are therefore toxic. Commercial medical laser products are designed to provide safe and reliable means of controlling the containment of the halogen gases that are used to generate excimer laser light output. Typically, the gases are stored in compressed gas cylinders, which are enclosed inside ventilated gas storage cabinets. The possibility of a release of toxic gas into the medical laser environment exists when the gas storage cylinders are handled or replaced. Therefore, despite the very low probability of occurrence, a properly installed medical excimer laser system should include emergency provisions for safely detecting, controlling, and removing any halogen gases that might be accidentally released into the medical environment. The SpectraPure 5300 provides an economical and convenient means of reducing the health hazards that may be associated with an accidental release of toxic gas into the medical laser environment. Alternative toxic gas removal methods may include more expensive facility gas control and fume scrubbing systems which must be

specifically engineered for the removal of halogen gases at the particular facility in compliance with local air quality codes.

2.2 TOXICITY HAZARD INFORMATION

To reduce toxicity, medical excimer laser gas mixes contain small quantities (less than 1%) of halogen. Also, as an added fail-safe measure, gas storage cylinders are typically equipped with permanent flow restricting orifices to retard the rate of emission of laser gases into the room air in the event of an inadvertent release of gas. For this reason, accidental emissions from the gas cylinder to air, if left uninterrupted, are gradual. Figure 2.1 illustrates a typical rate of emission from a properly flow restricted gas cylinder.

FIGURE 2.1 TYPICAL RATE OF EMISSION OF GAS FROM A FLOW RESTRICTED GAS CYLINDER



When exposed to air, halogens react with the air to form compounds such as acid gases (e.g. HF). Health hazards resulting from exposure to halogens and halogen compounds are quantified by OSHA and other health reporting agencies in limits for short term and long term exposures. Long term exposure limits are lower than short term limits. Fortunately, human smell is highly sensitive to the presence of halogens and halogen compounds in the very low ppm range. (e.g. 1-2 ppm fluorine). Long term halogen exposure limits are generally higher than the sensitivity of human smell.

The SpectraPure 5300 is intended to reduce the hazards associated with a short term exposure resulting from an accidental release of laser gas mix into room air. The SpectraPure 5300 cannot immediately eliminate odors that may be caused by the presence of halogen gas in the room air.

The low probability of release of excimer laser gas into room air might exist during a gas cylinder servicing routine. Cylinder servicing should be conducted only by trained and certified personnel during off-hour schedules, i.e. when the medical laser facility is not being used to treat patients. Off-hour scheduling, in addition to other equipment features and handling procedures, can significantly reduce the possible risks that may be associated with an unintended gas emission.

2.3 - AIR PURIFICATION METHOD

The SpectraPure 5300 Air Purifier functions to remove halogens, and halogen compounds from room air by circulating the air through a

highly absorbent activated charcoal (carbon) filter bed. The air is circulated by a doubleheaded 1000 CFM centrifugal blower. The blower circulates air through the room and mixes purified air with air that may be containing residual halogen gas. The carbon filter element reacts readily with any halogens that may be present in the room air to immediately form non-toxic halo-carbons. Each pass through the filter bed removes most of the halogen in the air that is passed through the filter.

The purifier air intake is located at the lower grill on the front of the unit. The room air is forced through the filter bed and exhausted through the top of the unit. No external duct work is required to install the SpectraPure 5300 Air Purifier. The purifier is designed to purify room air while circulating air through the room in which it is physically located. In order to produce high flow rates and clean the room air as quickly as possible, the purifier is designed for minimal flow restriction and features wide flow cross sections.

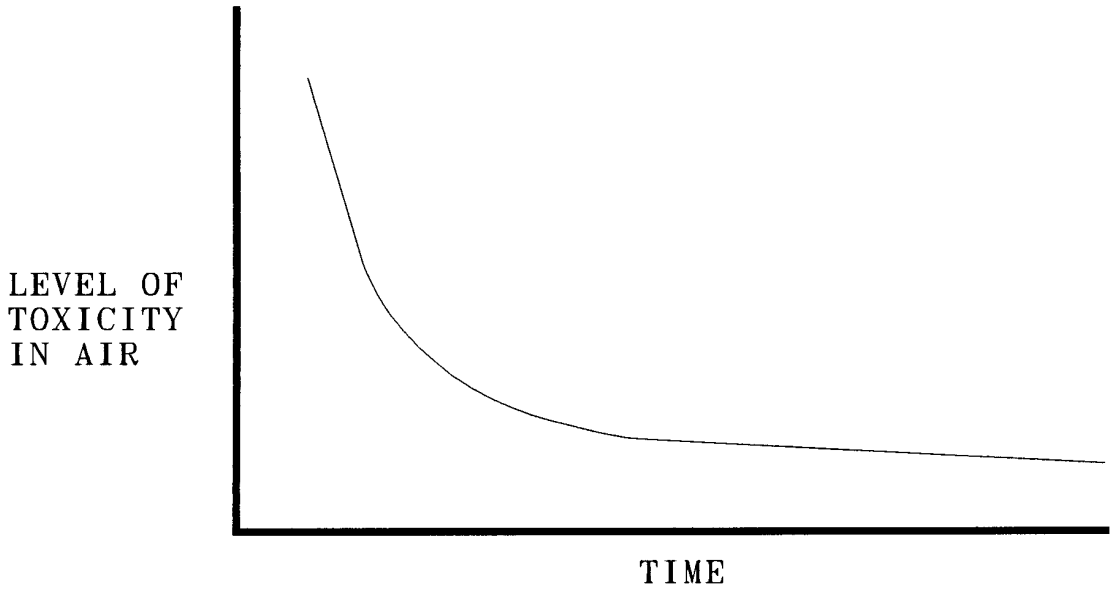
IMPORTANT WARNING: The SpectraPure 5300 Air Purifier is designed for easy and reliable operation. However, the unit must be properly installed, and air flow through the intake and exhaust vents cannot be obstructed or performance may be significantly impeded.

2.4 - PRINCIPLES OF AIR MIXING

As the SpectraPure 5300 Air Purifier cleans contaminated room air, it mixes purified air with contaminated air. If the gas leak emission has terminated, this purification process results in an exponential

dilution of the toxicity level in the air as purified air is mixed with contaminated air. Figure 2.4.0 illustrates the exponential rate of purification of contaminated air.

FIGURE 2.4.0 – EXPONENTIAL DILUTION OF CONTAMINATED AIR AS A FUNCTION OF MIXING

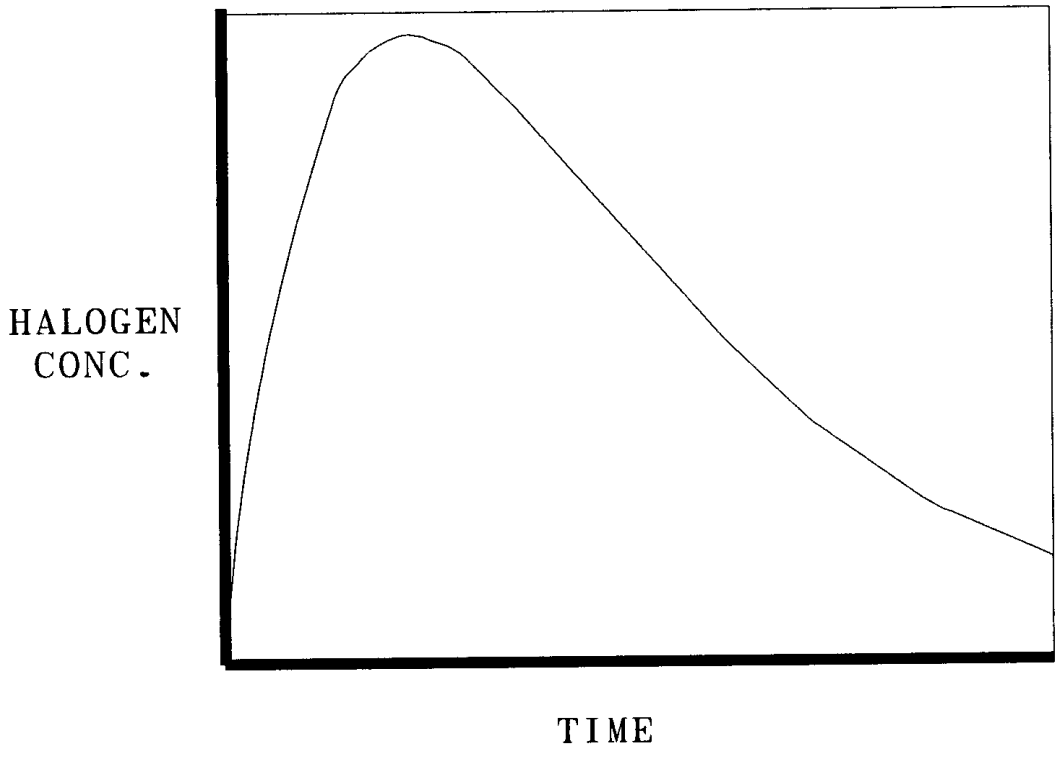


Several environmental factors may affect the efficiency of air circulation through the SpectraPure 5300 Air Purifier, such as the location of the purifier, the shape of the room, placement of objects in the room, etc. Because these factors may vary according to individual user locations, they are installation specific issues and must be properly addressed during the installation of the SpectraPure 5300 system. Recommendations for optimal installation are provided in Section 3 of this manual.

2.4.1 – Rate of Contamination vs. Rate of Purification

In the event of an accidental gas leak, the design of the SpectraPure 5300 assumes that toxic gas will continue to be released into the room as the purifier begins to clean the room air. The flow rate through the SpectraPure 5300 Air Purifier is much larger than the flow restricted cylinder leakage rate, so that the average atmospheric halogen and halogen compound concentration levels in the room are maintained at minimally toxic levels. As the cylinder gas level is depleted, the emission flow rate is reduced and the concentrations level of halogens in the room air will then be further reduced. Initially, the halogen and halogen compound concentration in the room will rise to a maximum as cylinder pressure is at a maximum. As the cylinder pressure drops, the halogen and halogen compound concentration in the room will be brought down gradually by the room purifier until the air contamination is brought to the sub ppm range. Figure 2.4.1 illustrates the combined effects of the competing rates of contamination and purification on halogen concentration in the room air.

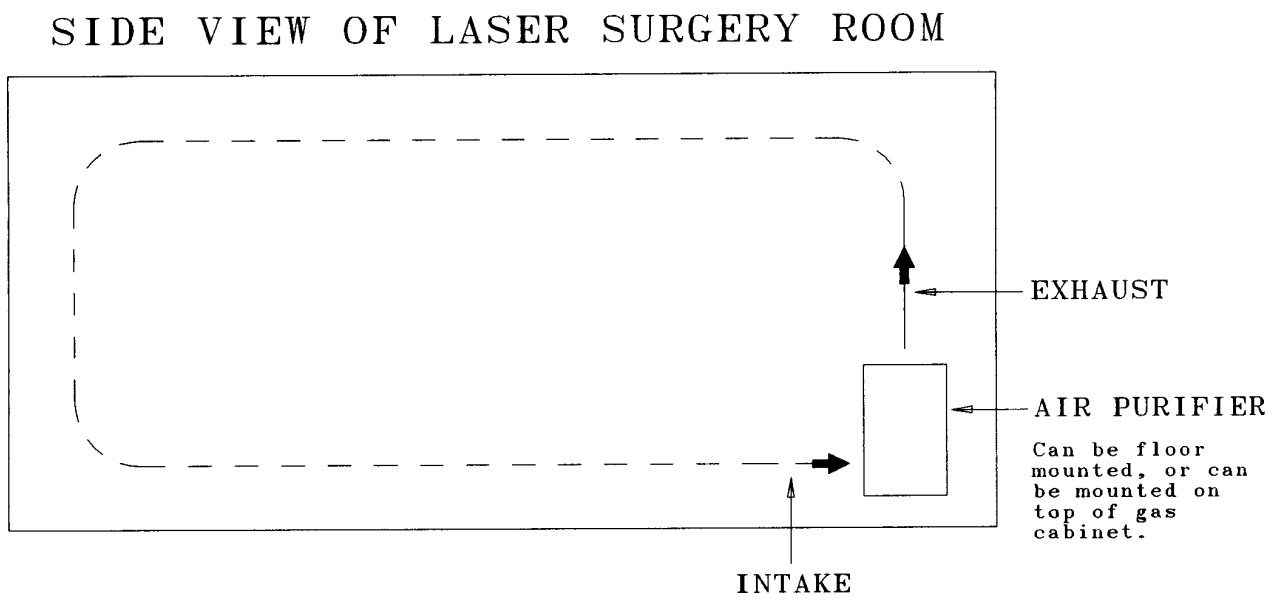
FIGURE 2.4.1 – TIME DEPENDENCE OF HALOGEN CONCENTRATION IN ROOM AIR WITH CONTAMINATION & PURIFICATION COMBINED



2.4.2 - Obstruction to Air Flow

The SpectraPure 5300 Air Purifier creates turbulent air flow, and is ideally located at one side of a rectilinearly shaped room. Furniture, equipment, or L-room shapes can create dead space of little or no air flow. Figure 2.4.2 illustrates an optimal location of the SpectraPure 5300.

FIGURE 2.4.2 - RECOMMENDED AIR FLOW



NOTE: Obstructions to flow can cut off air circulation.

SECTION 3 – INSTALLATION

3.1 – SUMMARY

The SpectraPure 5300 is designed to offer medical laser users an easy and inexpensive alternative to installing facility fume removal systems. However, the SpectraPure must be properly installed and remain unobstructed and in Standby Mode in order to provide proper performance. This section provides necessary information and instructions for installing the SpectraPure Model 5300 Room Air Purifier.

3.2 – UNPACKING THE AIR PURIFIER

The SpectraPure 5300 Air Purifier is shipped from the factory securely packed in a heavy wall cardboard shipping carton that is steel strapped in an upright position to a wooden skid. Before formally receiving the shipment, and before opening the carton, make sure to check for possible shipping damage. If shipping damage is suspected, follow the procedures recommended on page ii at the front of this manual.

To open the carton, cut the steel straps with a wire cutter and remove the straps. Remove the small cardboard box from the top of the shipping carton. The smaller box contains the Remote Start Button, and the Gas Detector – if this accessory has been provided with the system. Next, remove the large carton cover by lifting the carton off of the Air Purifier. The purifier is supported inside the shipping carton with foam corner braces. These corner braces may cause some resistance

when lifting the carton off of the purifier. After the carton cover has been removed, lift the Air Purifier off of the shipping skid. This requires two people, standing on opposite sides of the unit. Lift the Air Purifier off of the skid by holding the packaging twine that is wrapped around the unit. To avoid damaging the purifier, keep the unit in a vertical orientation and do not lift by holding onto the upper cabinetry.

Untie the packaging twine and lift the plastic wrapper off of the top of the Air Purifier. Retain all packaging materials, for possible return shipment, until the unit is completely installed.

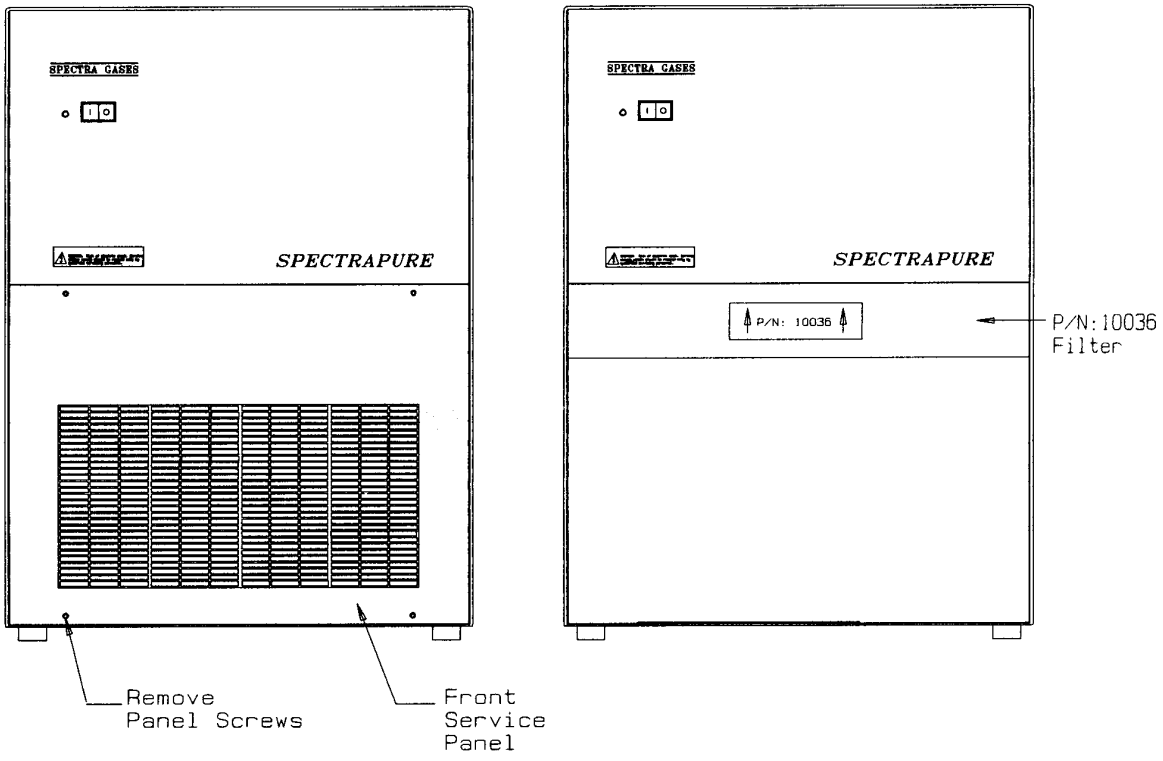
Remove the Front Service Panel (see Figure 3.2.1) by unscrewing the four panel screws. **CAUTION: Risk of electric shock. Service access panels should be removed only by qualified servicing personnel.** Next, remove the P/N 10036 Filter Element (which is wrapped in black plastic) by pulling the filter with two hands out of the front of the unit. A tight fit for air sealing purposes may cause some resistance due to extra thickness of the plastic. The filter is wrapped in plastic to protect the absorber during transit. Remove the plastic wrapping material and discard. It is normal to observe some dust particles inside the packaging material. Insert the P/N 10036 Filter Element back into the Air Purifier locating the filter label with replacement date facing the front of the purifier. Install the filter with the flow direction arrows on the label pointing upwards.

WARNING: The SpectraPure 5300 cannot function unless the plastic shipping wrapper is removed from the P/N 10036 Filter Element.

If the SpectraPure 5300 has been purchased with an SGI Model 215

Gas Cylinder Storage Cabinet, leave the Front Service Panel off the unit in order to follow the procedures listed in Section 3.7. If the Gas Cabinet has not been purchased, replace the Front Service Panel back on the front of the unit.

FIGURE 3.2.1 – REMOVING THE FRONT SERVICE PANEL



NOTE: Plastic shipping wrapper must be removed from the P/N 10036 Filter before operating the SpectraPure 5300 Air Purifier.

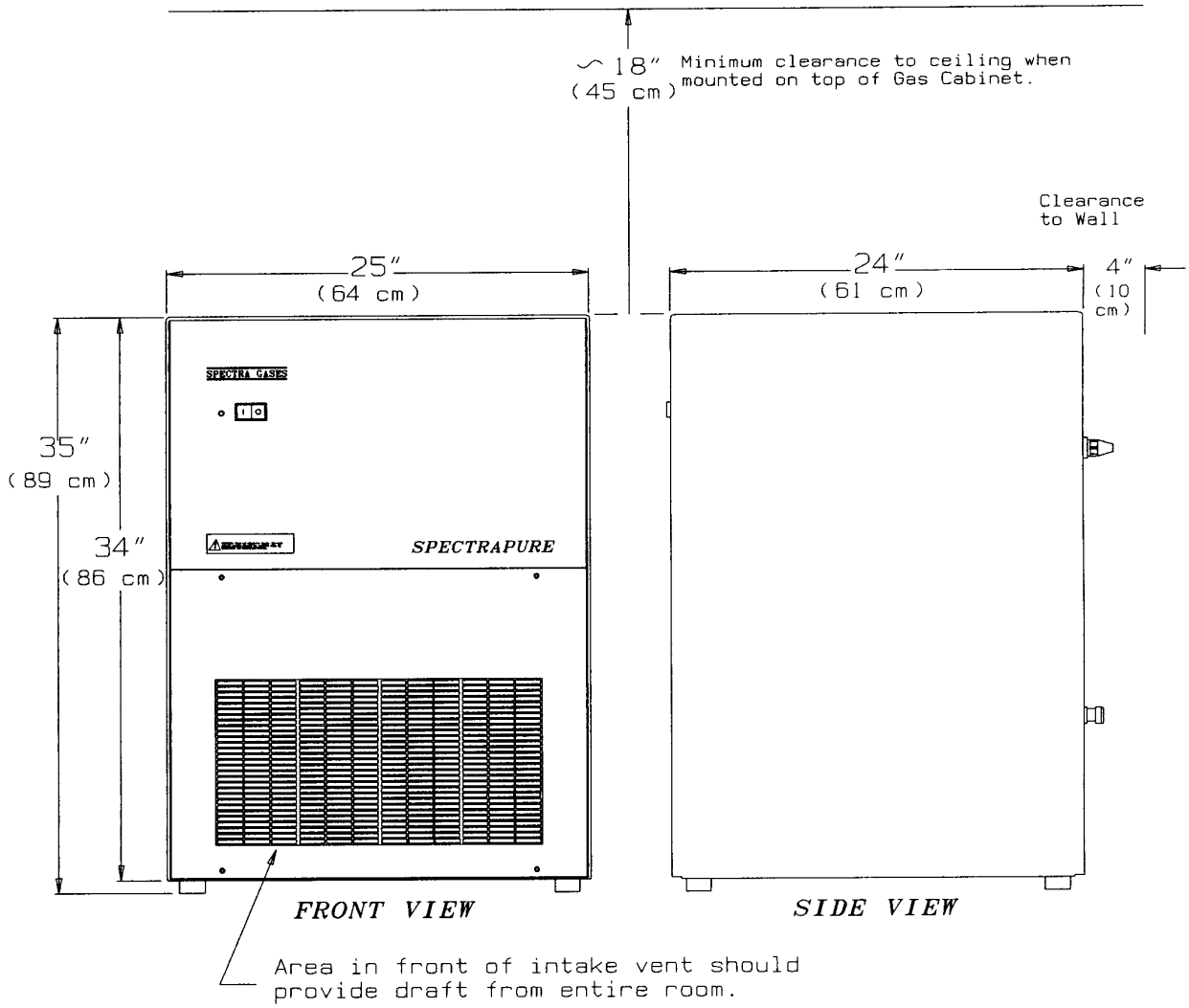
3.3 – LOCATING THE SPECTRAPURE EQUIPMENT IN THE LASER SURGERY ROOM

The SpectraPure 5300 Air Purifier is designed to be either floor mounted, or it can be mounted directly on top of the Model No. 215 Gas Cylinder Storage Cabinet, see Section 3.7.

The purifier, or the Gas Cabinet, should be installed onto a hard, and level floor surface. Clearance behind the purifier should be a minimum of 4 inches to the wall. Clearance above the purifier should be a minimum of 1½ feet if it is mounted on top of the Gas Cabinet. The intake grill on the front of the purifier should be freely open to room air. **WARNING: Do not obstruct Air Purifier intake or exhaust vents or SpectraPure performance may become seriously impeded.** It is desirable to locate the Air Purifier as closely as possible to the laser gas storage cylinders. It is also desirable to locate the Air Purifier near the excimer laser system. Figure 3.3.0 illustrates required clearances for Air Purifier installation.

As much as is practical, minimize or eliminate any obstructions that would inhibit air flow through the SpectraPure Air Purifier. Furniture and equipment in the room should be positioned so as to facilitate proper circulation of air through the purifier, see Figure 2.4.2.

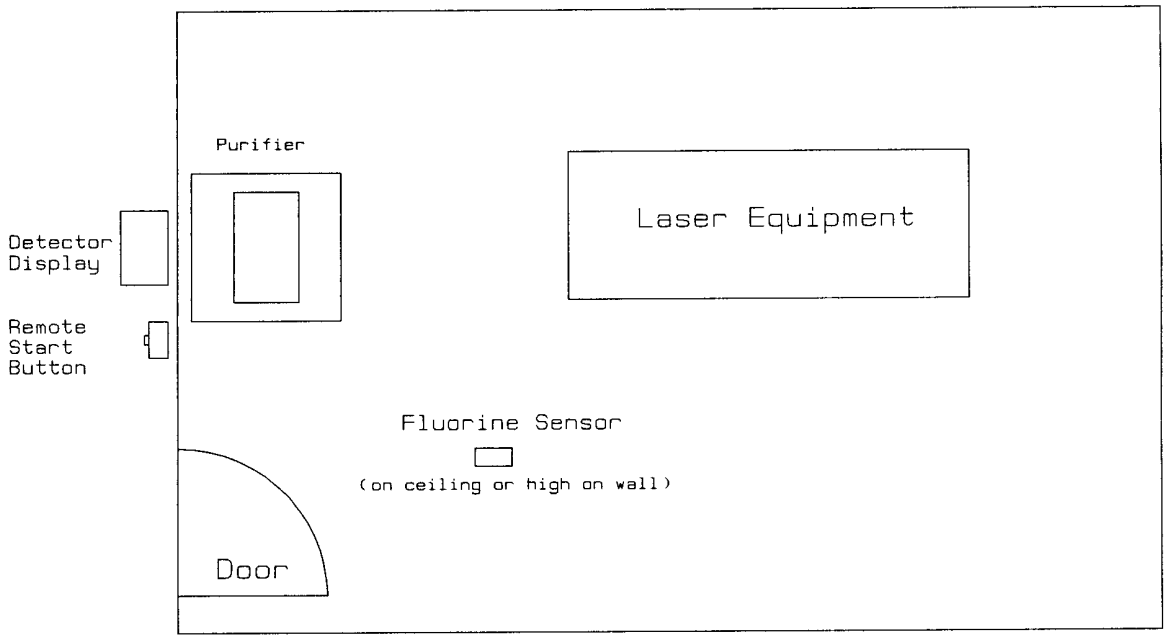
FIGURE 3.3.0 - CLEARANCES FOR INSTALLATION


≃ 18" (45 cm) Minimum clearance to ceiling when mounted on top of Gas Cabinet.
Clearance to Wall
25" (64 cm)
24" (61 cm)
4" (10 cm)
35" (89 cm)
34" (86 cm)
SPECTRA GASES
SPECTRAPURE
FRONT VIEW
SIDE VIEW
Area in front of intake vent should provide draft from entire room.

3.3.1. - Optimizing Air Flow

As indicated in Section 2., it is important to properly locate the SpectraPure Air Purifier in the room to optimize mixing of room air. The SpectraPure 5300 creates turbulent air flow, and is ideally located at one end of a rectilinearly shaped room, centered in the wall section at the end of the room. Furniture, equipment, or additional room features can inhibit air flow. Figure 3.3.1 illustrates optimal locations of the SpectraPure 5300 Equipment. If this recommended floor plan is not convenient, or practical, the SpectraPure equipment may be suitably located in a diagonal orientation in a corner of the room.

FIGURE 3.3.1 - RECOMMENDED ROOM LOCATION - TOP VIEW



3.4 – ISOLATING LASER SURGERY ROOM AIR SPACE

Follow the laser system manufacturer's recommendations in order to prepare the laser surgery room for equipment installation.

The laser surgery room should be in an enclosed air space. In the event of an accidental release of laser gas mix into room air, the room should be isolated and closed off to allow the SpectraPure System to de-contaminate the air space and to prevent the dispersion of toxic gas into other areas of the medical facility.

Any HVAC air intake ducts that are present in the room should be equipped with isolation dampers that can be closed prior to beginning gas cylinder servicing. The SpectraPure Air Purifier can be wired to automate closing of HVAC dampers. See Section 3.7.3. **WARNING: HVAC systems may create competing air flow and may also carry toxic gases to other areas of the medical facility.** Ideally, the laser surgery room should be rectilinear in shape, and be no larger than 1700 cubic feet. If the cubic volume of the room exceeds 3000 cubic feet, or, if the room is not adequately shaped for air flow to the SpectraPure Air Purifier, it may be necessary to make additional provision for circulating, or purifying room air.

3.5 – ELECTRICAL INSTALLATION

The SpectraPure 5300 Air Purifier is shipped from the factory ready to plug into an appropriate wall voltage outlet. However, the voltage supply serving the SpectraPure equipment should be isolated from any wall mounted ON/OFF switches, to prevent the possibility of inadvertent disabling of electric power to the SpectraPure equipment.

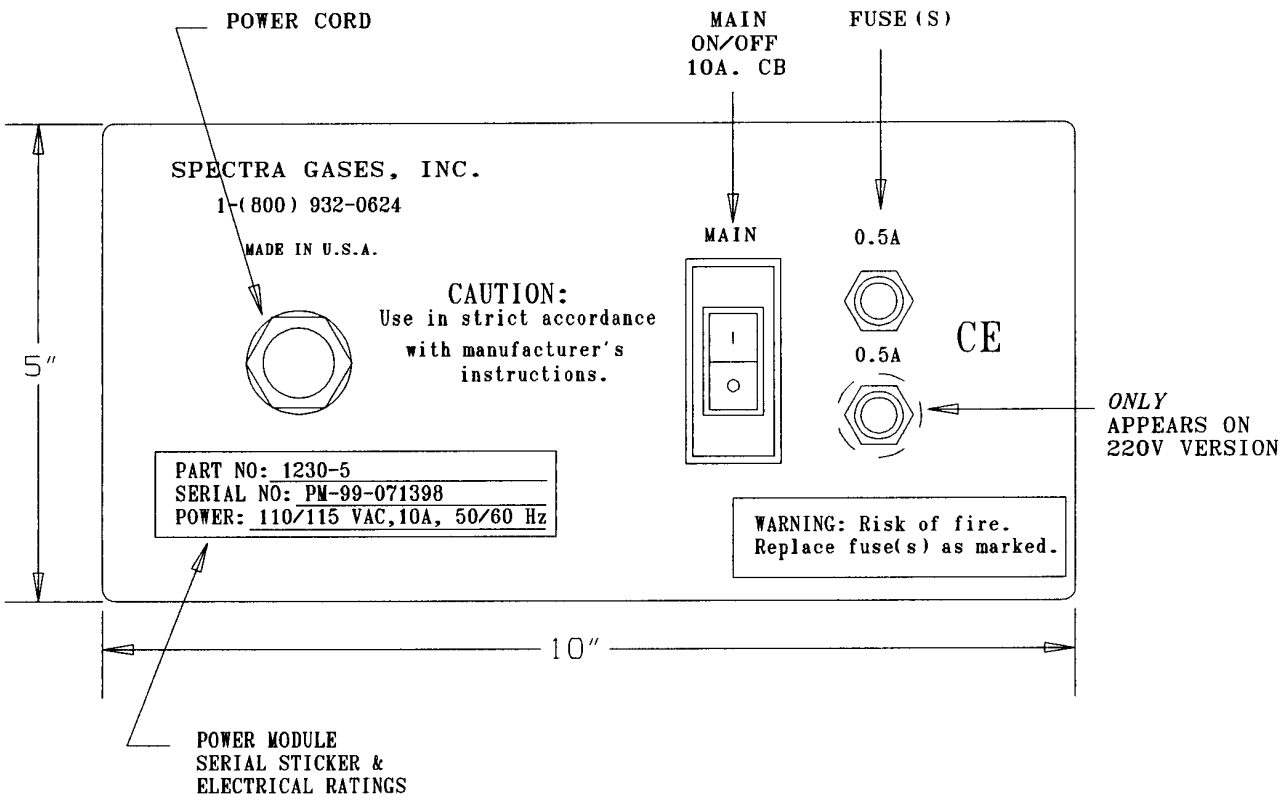
The SpectraPure 5300 is intended to serve an emergency function and should be assured of continuous electrical power supply despite any external power failures. If the medical facility has emergency power generation capability, the SpectraPure equipment should also be provided with emergency back-up electrical power. If it is necessary to equip the laser surgery room with an appropriate wall voltage outlet in order to meet these requirements, then a certified electrician should be contracted to complete the installation in strict compliance with all pertinent electrical codes.

An Air Purifier Electrical Schematic and a Control Logic Table are provided in Section 7 of this manual. The Air Purifier is available in two versions. One version is intended for operation on 110VAC 50/60 Hz. The other version is intended for operation on 220/240VAC 50/60 Hz. Electrical Schematics for both versions are included in Section 7 of this manual. For specific voltage ratings on the Air Purifier that is being installed, see the power requirements listed on the Rear Power Panel of the unit. Power to the Air Purifier is enabled by a MAIN ON/OFF Circuit Breaker Switch which is located on the back panel of the purifier next to the main power cord. For current draw information, see Section 7.1 - Table of Specifications.

The SpectraPure 5300 Air Purifier uses a voltage regulated 12 VDC power supply to provide power to the external interlocks and control circuit functions (i.e. Remote Start, Gas Detector, and Auxiliary Output). The 12 volt circuit is fuse-protected from overloads by a 0.5 Amp panel mounted fast blow fuse(s). The 110 VAC version features one fuse. The

220 VAC version features two fuses. The fuse(s) are located on the Rear Power Panel of the unit. Figure 3.5.1 illustrates the rear Power Panel.

FIGURE 3.5.1 - REAR POWER PANEL



3.6 – INSTALLING THE REMOTE START BUTTON

The Remote Start Button is intended to enable remote actuation of the Air Purifier. See Section 4.4. The Remote Start Button is designed for wall mounting, and is intended for installation at a convenient height, onto a wall directly outside the door leading into the laser surgery room, see Figures 3.6.0, and 3.6.1.

The Remote Start Button functions as a normally open momentary switch on a 12 VDC control circuit. 12 VDC power is provided by the Air Purifier electrical system, see Section 3.5.

Contract a certified electrician to connect the Remote Start Button in compliance with local medical facility electrical codes. 18 gauge wire is recommended for use. Wire type, insulation type, shielding, routing, color coding, etc. should be installed in conformance with all pertinent electric codes. Properly rated strain relief should be incorporated onto the Remote Start Button feedthrough. Two feedthrough locations are provided as alternatives, as follows:

1. Feedthrough the bottom of the switch

– or –

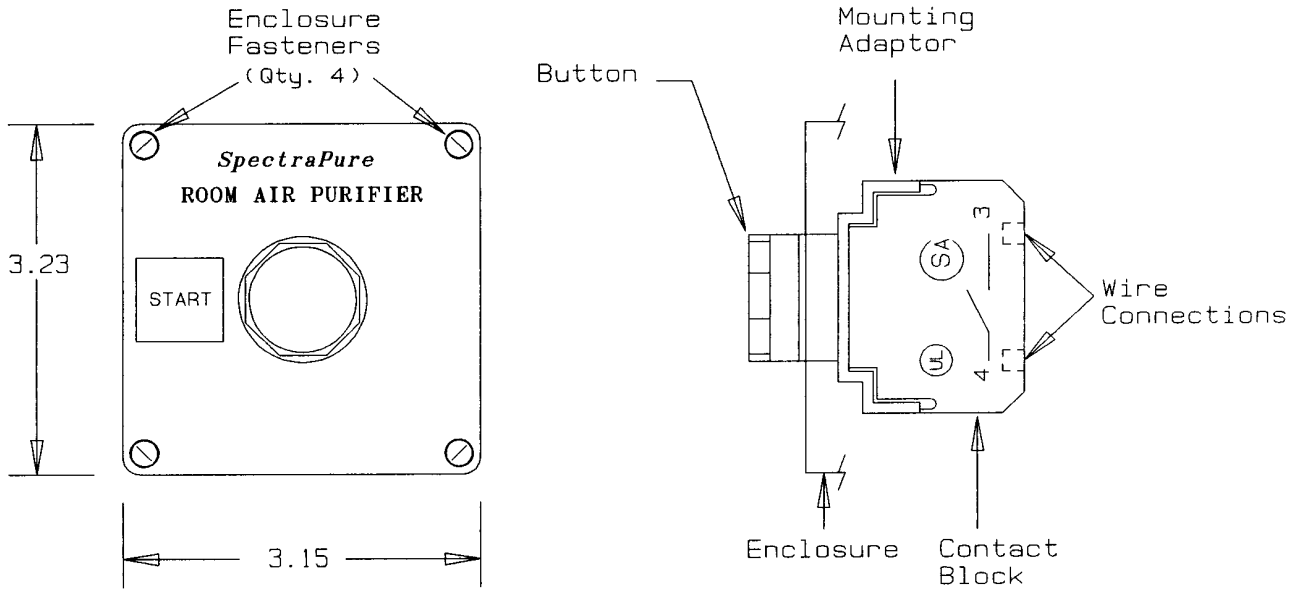
2. Feedthrough the back of the switch

To connect wires to the switch, remove the switch cover, and insert stripped cable into the #3, and #4 terminals in the E22B2 Contact Block and tighten the connections. For this procedure, the Contact Block can be left in the factory mounted position on the Mounting Adaptor. If it is disconnected to install the wires, reconnect the Contact Block onto the Mounting Adaptor in the #1 or #2

positions on the Mounting Adaptor so that the switch closes when the Button is depressed.

To complete the electrical installation of the Remote Start Button, solder pins are included with the Air Purifier Back Panel Connector Parts Kit. Install the necessary length of wire. Solder the pin terminations that are provided with the Air Purifier installation kit to the wire ends, and insert the pins into the purifier back panel connector as indicated on Figure 3.6.1.

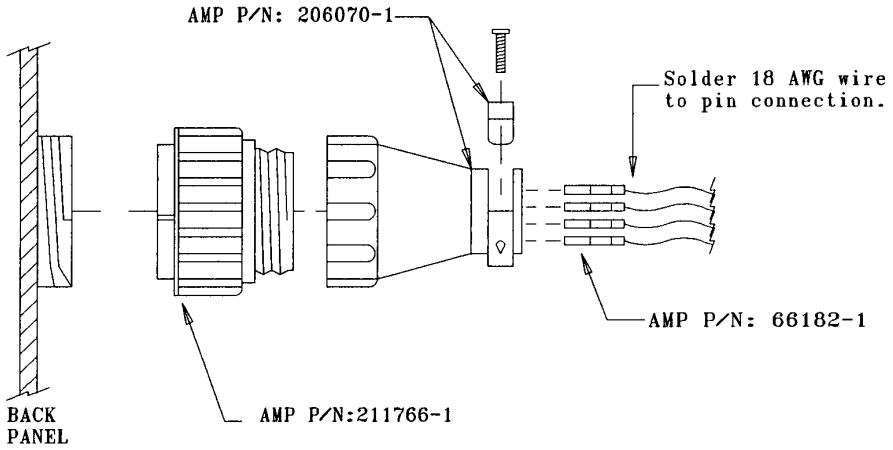
FIGURE 3.6.0 – AIR PURIFIER REMOTE START BUTTON

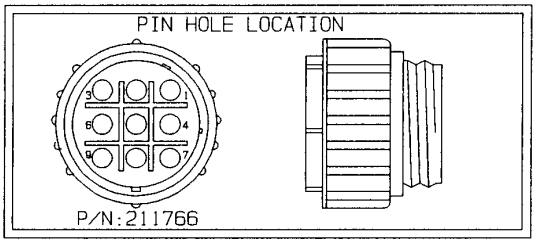


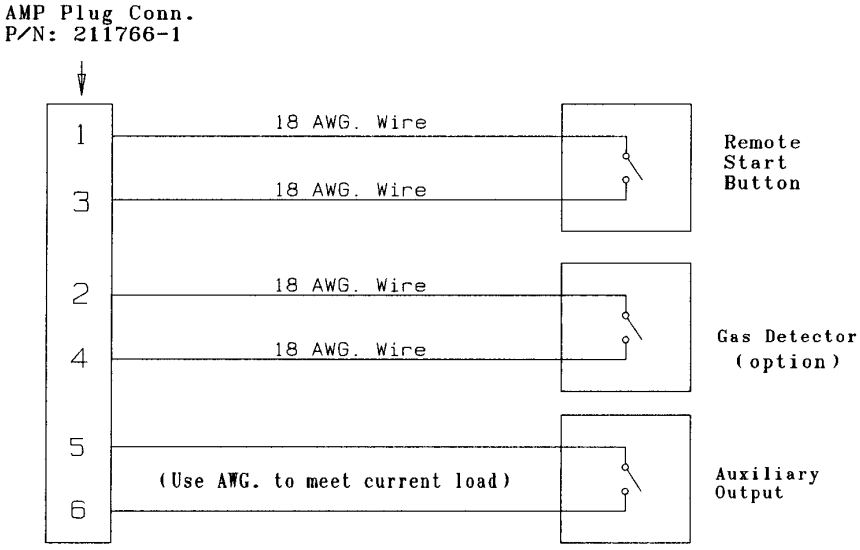
Disconnect Fasteners to open casing cover. Mount wall panel. Feed extra length of wire for service access through wall mounting panel, and connect wires to Contact Block. Replace casing cover.

FIGURE 3.6.1 – AIR PURIFIER BACK PANEL CONNECTOR WIRING INSTALLATION

DIAGRAM & SCHEMATIC







3.7 - INSTALLING EQUIPMENT OPTIONS

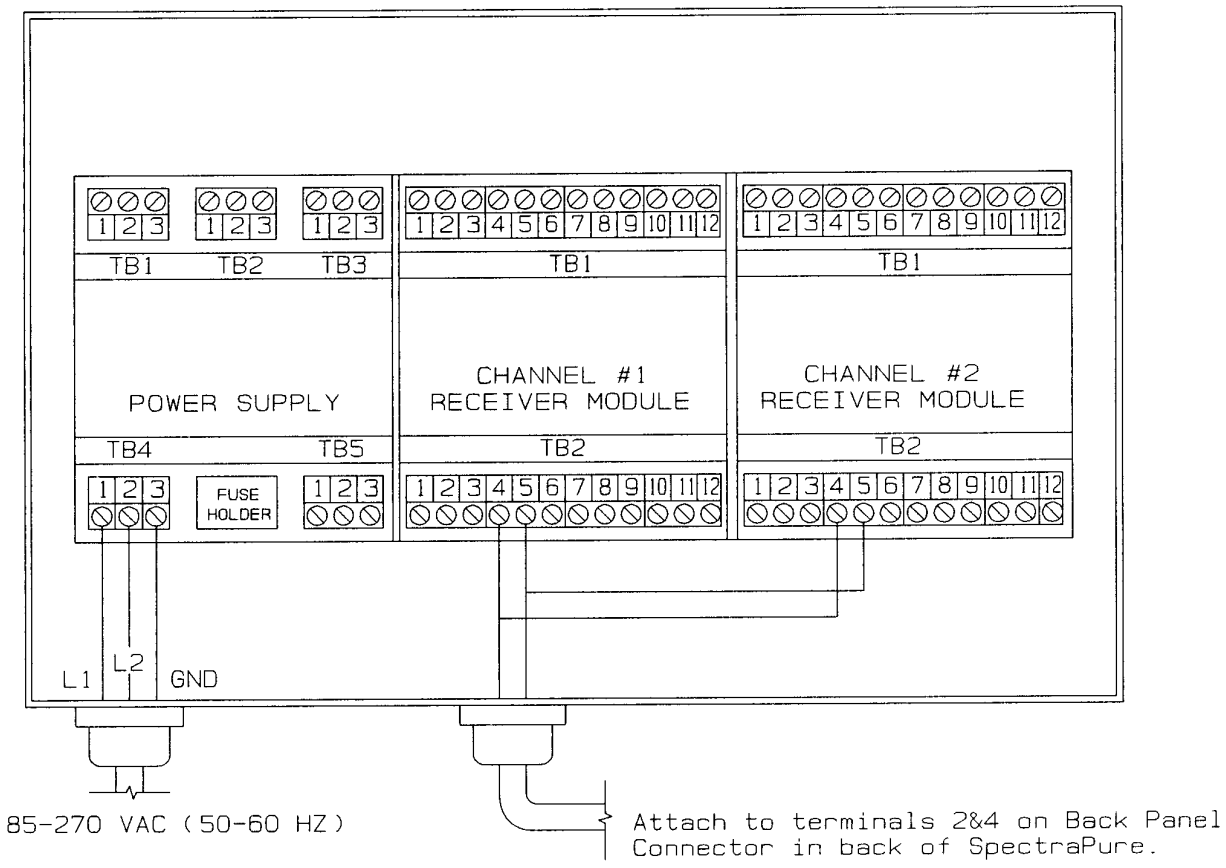
This section provides the instructions for mating the SGI Model No. 215 Gas Cylinder Storage Cabinet, and, or the Series 6400 Gas Detector to the SpectraPure Model No. 5300 Room Air Purifier. Additional instructions for installation are provided with these other SGI products.

3.7.1. - Installing the Series 6400 Gas Detector to Interface with the SpectraPure 5300 Air Purifier

The Series 6400 Gas Detector can be used to automatically actuate the SpectraPure 5300 Air Purifier. Whether the Single Sensor or Double Sensor option is selected, it is desirable to locate the sensor(s) in direct proximity to a possible gas leak source. Most excimer laser gas mixes contain portions of helium gas, which causes the laser gas mix to rise in the room. Therefore, a probable early detection point is high on a nearby wall or on the ceiling above the possible leak source. The Gas Detector Receiver Module can be located outside the laser surgery room and wall mounted next to the Remote Start Button - see Section 3.6. This external location enables the equipment operator to remotely monitor laser room air conditions.

In order to wire the detector to the Air Purifier, the Gas Detector Receiver Module alarm contact relays should be wired to the Air Purifier Back Panel Connector following the electrical installation instructions provided in Section 3.6 ("Installing the Remote Start Button"), and by connecting wires to the Gas Detector Receiver Module as indicated in Figure 3.7.1.

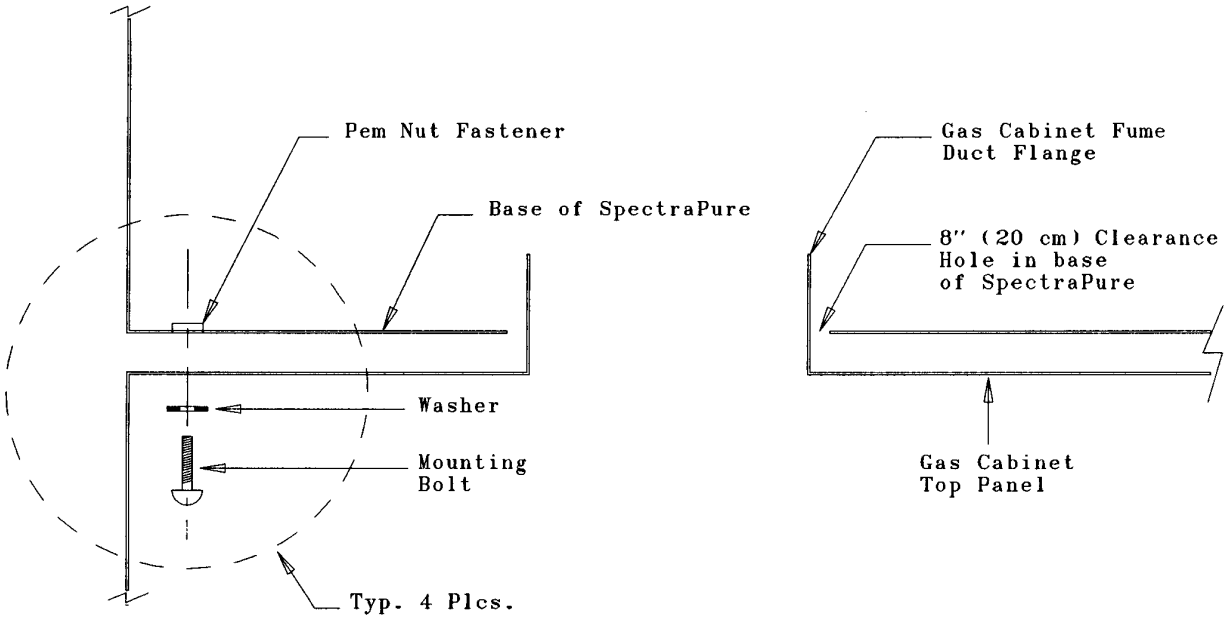
FIGURE 3.7.1 – WIRING THE AIR PURIFIER TO THE SERIES 6400 GAS DETECTOR RECEIVER MODULE



3.7.2. – Installing the Air Purifier Onto The Model No. 215 Gas Cylinder Storage Cabinet (Option)

As indicated in Section 3.2, the Front Service Panel should be removed from the front of the Air Purifier to prepare for mating the purifier to the gas cabinet. The P/N 10036 Filter Element should also be removed from the Air Purifier in order to provide extra, internal clearance, as well as to reduce the weight of the unit in preparing for the next step. In order to remove mounting hardware, prepare to lay the purifier on its face without scratching the paint or damaging the protruding controls. Remove the 24 inch x 24 inch foam pad from the floor of the Air Purifier shipping carton, and lay it onto the floor of the room. With 2 persons, one on each side of the unit, carefully lay the purifier on its face, taking care to lay the unit onto the foam pad. Unscrew the rubber mounting feet from the bottom of the purifier and retain the bolts and washers. Next, lift the Air Purifier back upwards to a vertical orientation. Now, lift the purifier above the gas cabinet. Using the 8 inch (20 cm) diameter clearance hole in the bottom of the purifier as a visual guide, lay the purifier down on top of the Gas Cabinet. The Gas Cabinet fume duct flange should insert through the clearance hole in the bottom of the purifier. Next, line up the 4 corner holes in the bottom of the Air Purifier with the 4 holes in the top of the Gas Cabinet. Using the bolts and washers that were removed from the Air Purifier rubber mounting feet, bolt the Gas Cabinet to the Air Purifier as indicated in Figure 3.7.2. Next, insert the P/N 10036 Filter Element into the purifier per instructions provided in Section 3.2, and replace the Front Service Panel.

FIGURE 3.7.2 - ATTACHING THE AIR PURIFIER TO THE 215 GAS CABINET



3.7.3 – The Air Purifier Auxiliary Output Relay

The SpectraPure 5300 Air Purifier is factory equipped with a switch closing relay which may be used to provide a control signal to external devices, such as controlling the functions of an HVAC duct automatic damper system. The relay switch is normally open with a rated contact of 15 Amps. When the blower in the Air Purifier is turned on, either manually or remotely, the relay switch energizes and provides a circuit closure for controlling an external voltage circuit.

To connect the Output Signal, install the necessary length of wire, solder pin terminations to the wire ends, and insert the pins into the back panel connector as described in Section 3.6.

SECTION 4 – OPERATING INSTRUCTIONS

This section provides instructions for the routine operation of the SpectraPure Model No. 5300 Room Air Purifier. Instructions necessary for the safe handling of laser gases and medical laser equipment are not provided here.

4.1 – CONTROL FEATURES

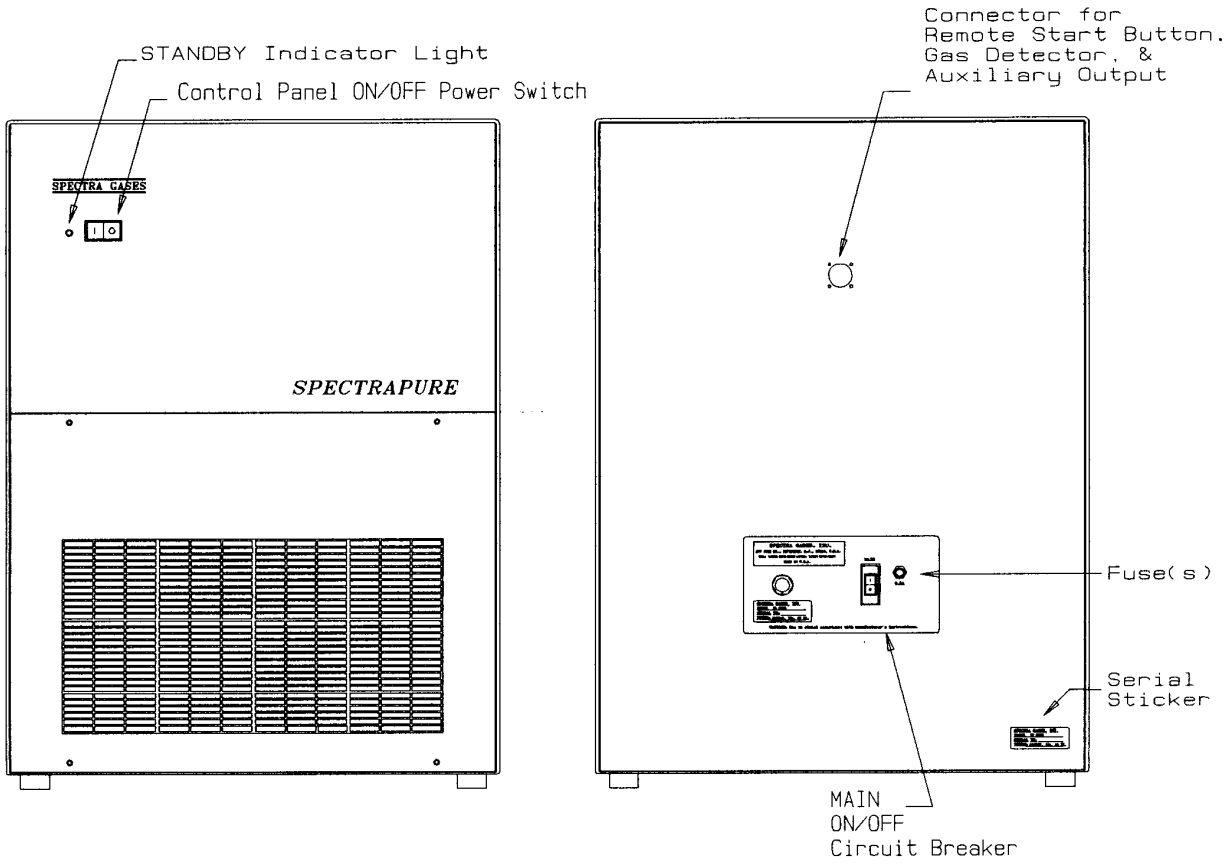
SpectraPure 5300 Air Purifier controls are easy to use. Table 4.1.1 lists control functions. Table 7.3 lists control logic. Figure 4.1.2 illustrates control locations.

TABLE 4.1.1 – CONTROL FUNCTIONS

Refer to Figure 4.1.2 for control locations.

ITEM #	CONTROL FEATURE	LOCATION ON SPECTRAPURE	STATUS	INDICATOR	FUNCTION
1.	MAIN Circuit Breaker ON/OFF Switch	Rear Power Panel	ON	I engraving	Provides line voltage to enable STANDBY ready condition. Also provides electrical overload protection.
			OFF	O	Serves as the electric power disconnect switch. Can be used to service system.
2.	Control Panel ON/OFF Switch	Front Control Panel	ON	I (Lens lights up when power is - "ON")	Switches the blower - "ON".
			OFF	O	Turns "OFF" the blower motor, unless overided by interlocks.
3.	STANDBY Indicator Light	Front Control Panel	ON	Light on.	Indicates that the MAIN Circuit Breaker is "ON" and that the purifier is in a STANDBY ready condition with line voltage present.
			OFF	Light off.	Indicates that there is no electrical power to the purifier - or - may possibly indicate that the 12 VDC Power Supply has failed.
4.	Remote Start Button	Connected to Back Panel Connector. See Section 3.6.	ON	Control Panel Power Switch "ON", or "OFF".	Provides momentary switch closure to supply electric power to blower motor.
			OFF		No function. The purifier must be turned off locally with the Control Panel Power Switch.
5.	Contact Relay for Gas Detector	Connected to Back Panel Connector. See Section 3.7.	ON	Control Panel Power Switch "ON", or "OFF".	Provides switch closure to supply electric power to blower.
			OFF		The purifier must be turned "OFF" locally with the purifier Control Panel ON/OFF Switch. The purifier will not turn off if alarm condition persists.
6.	Auxiliary Output	Connected to Back Panel Connector. See Section 3.7.	ON	Control Panel Power Switch "ON", or "OFF".	Provides a circuit closure for controlling an external voltage circuit.
			OFF		Indicates that the blower motor is "OFF".

FIGURE 4.1.2 – AIR PURIFIER CONTROL LOCATIONS



FRONT VIEW *REAR VIEW*

WARNING: The MAIN Circuit Breaker must be in the "I" (on) position in order to enable a STANDBY ready condition to exist and to allow the air purifier to respond properly in the event of an accidental release of toxic gas into room air.

4.2 – "MAIN" – CIRCUIT BREAKER – "ON"

After completing installation, or after servicing of the Air Purifier, turn the MAIN electric power circuit breaker on the back panel of the purifier into the "I", or "ON" position. This provides line voltage to the purifier electrical system and enables a STANDBY ready condition to exist, see Section 4.2.1. **The control Panel LED Indicator Light should light up to indicate that line voltage is being provided to the purifier.** Contact the manufacturer for immediate assistance if there is any failure of the STANDBY light indicator.

The MAIN Circuit Breaker Switch should be left in the "ON" position at all times, except when servicing the SpectraPure Air Purifier.

4.2.1 – STANDBY Mode

The SpectraPure 5300 Room Air Purifier is intended to function as an emergency safety device. Because the Air Purifier is electrically actuated, electric power must be provided to the purifier at all times in order for the system to be enabled to respond properly in the event that an emergency condition exists. The MAIN Circuit Breaker is rear panel mounted for access only by qualified servicing personnel. THE MAIN BREAKER SHOULD NOT BE THE PLANNED RECOURSE FOR EMERGENCY ACTUATION! Also, the purifier should be assured of continuous electrical power, even in the event of an external power failure. The purifier should be properly installed to facilitate emergency actuation. See Section 3.

The red LED Light Indicator on the purifier control panel lights up to indicate that the unit is in a STANDBY condition and ready for emergency actuation.

4.3 – CONTROL PANEL ON/OFF SWITCH – "ON"

Whenever a service technician will be handling gas cylinders, or whenever a gas leak is suspected, the Air Purifier should be turned – "ON". As an extra precaution, laser or gas cylinder servicing should be performed during off-hour schedules with a minimum number of personnel present. In addition to following manufacturer's safe handling procedures and pertinent instructions, the following procedures should also be used during gas cylinder servicing:

STEP	DESCRIPTION
1.	Isolate laser surgery room during off-hour schedules. Close doors and close HVAC duct dampers.
2.	Turn SpectraPure 5300 Air Purifier – "ON".
3.	Begin laser or cylinder servicing.

4.4 – REMOTE START BUTTON – "ON"

In the event of an unintended release of laser gas into laser surgery room air, the room should be immediately evacuated by all personnel, and the SpectraPure Air Purifier should be turned – "ON" _ (if it is not already – "ON") by depressing the Remote Start Button. Once the purifier is actuated, it must be locally turned – "OFF" by depressing the "O" (OFF) momentary power switch on the purifier control panel. The Remote Start Button cannot be used to deactivate the Air Purifier.

4.5 – GAS DETECTOR ACTUATION OF THE AIR PURIFIER

As an extra option, the SGI Series 6400 Gas Detector can be used to start the SpectraPure Air Purifier automatically at factory set ppm sensitivity levels. The Gas Detector can also be used to monitor air quality conditions in the laser surgery room, before personnel re-enter the room.

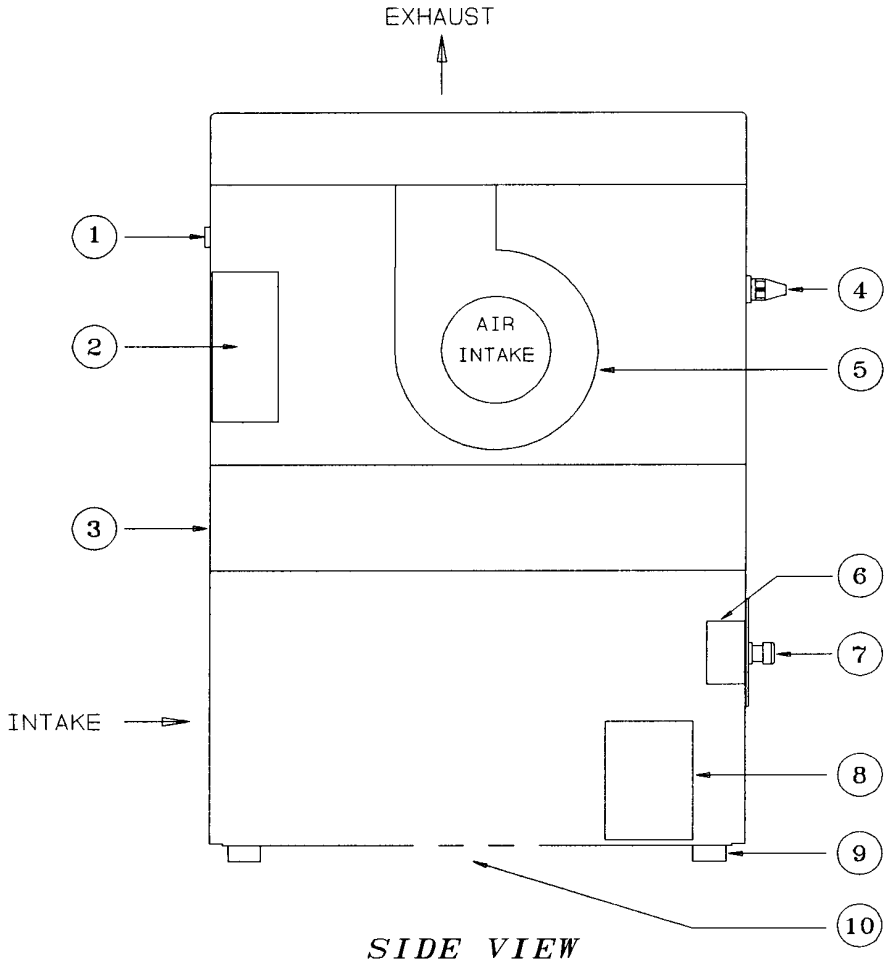
SECTION 5 – DESCRIPTION OF MAIN COMPONENTS

The SpectraPure 5300 Air Purifier is specially rated for removing trace amounts of halogen and acid gases from medical facility room air. Important components of the purifier include:

P/N	DESCRIPTION
1230-2-01	Blower Assembly
1230-4-17	12 VDC Power Supply
10036	Filter Element
1230-8-06	Stepdown Transformer (only for operation on 220 VAC)

Figure 5.0 illustrates the location of the main components of the SpectraPure 5300 Air Purifier.

FIGURE 5.0 – AIR PURIFIER COMPONENT DIAGRAM



ITEM	DESCRIPTION
1.	Control Panel ON/OFF Switch
2.	Control Electronics (including 1230-4-17 12 VDC Power Supply)
3.	P/N 10036 Filter Element
4.	Back Panel Connector
5.	P/N 1230-2-01 Blower
6.	Line Voltage Power Supply Components
7.	Rear Power Panel
8.	Stepdown Transformer (220 VAC version only)
9.	Removable Rubber Mounting Feet
10.	215 Gas Cabinet Clearance Port

5.1 – P/N 1230-2-01 BLOWER ASSEMBLY

Room air flow is circulated through the SpectraPure 5300 Air Purifier by the P/N 1230-2-01 Blower Assembly, which is designed to overcome the slight pressure drop (restriction to flow) produced by the P/N 10036 Filter Element, while producing 1000 cubic feet per minute (CFM) flow on 60 Hz voltage frequency, or, 850 CFM on 50 Hz voltage frequency. The P/N 1230-2-01 Blower is a squirrel cage, dual head centrifugal blower which is driven by a ½ h.p. direct drive electric motor. The 1230-2-01 Blower Assembly includes the Blower Unit, the Blower Mounting Plate, and the air tight Blower Housing Assembly. High r.p.m. is attained (1230 rpm – 50 Hz.; 1470 rpm – 60 Hz.) during operation. Though the 1230-2-01 Blower Housing is Screen protected, care must be taken to avoid dropping foreign, or hard objects into the blower output. **WARNING: Do not insert or drop hard objects into blower housing or a serious safety hazard can exist as objects may be thrown out of blower and into the room at high speeds.**

During start-up, the blower motor can draw high initial surge current (> 13A 110V, > 6A 220V), which is short term (few seconds) and normal. The motor is equipped with a high voltage capacitor to facilitate start-up. Average electrical power loading during operation on 60 Hz. is 660 Watts. Average electrical power loading on 50 Hz. is 720 Watts. The blower motor is also protected from overheating with an Automatic Thermal Overload Sensor. Should the blower stop, or fail to start, allow 10 – 15 minutes to cool the motor. Check load conditions and attempt to restart.

If it becomes necessary to service the SpectraPure 5300 Air Purifier, some servicing procedures may require removal of the 1230-2-01 Blower Assembly in order to gain access to the blower and other electronic components (including the P/N 1230-4-27 VDC Power Supply). Request service instructions from the manufacturer should this become necessary. **WARNING: Never operate the P/N 1230-2-01 Blower without the purifier protective cabinet cover in place on the purifier.**

The 1230-2-01 Blower Unit is conservatively rated for over 30,000 hours continuous operation. Because the Blower Unit motor shaft bearings are double sealed, the 1230-2-01 Blower requires little or no maintenance.

5.2 - P/N 1230-4-17 12 VDC POWER SUPPLY

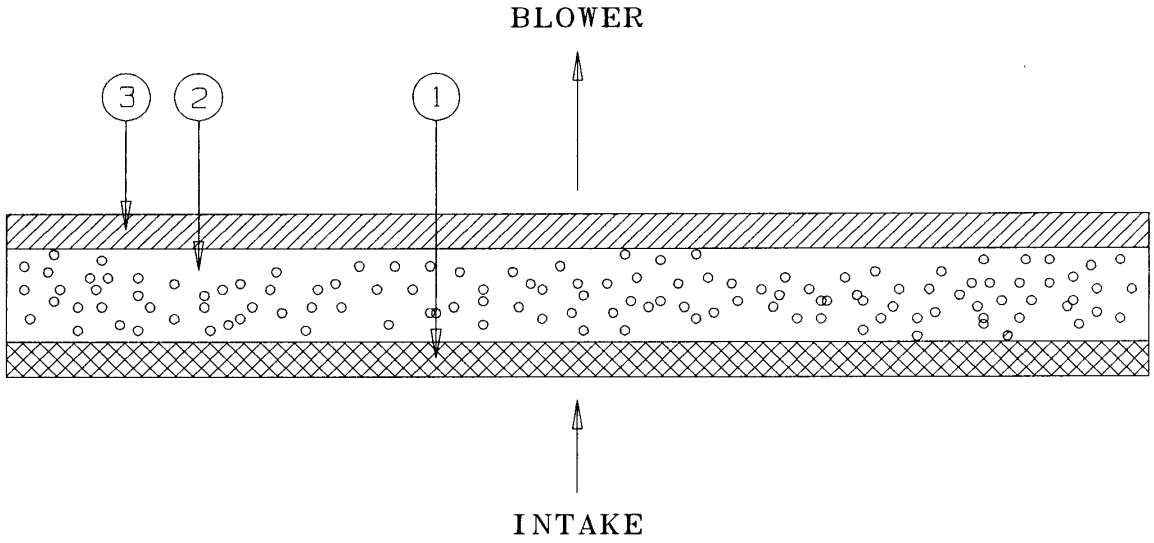
The SpectraPure 5300 Air Purifier electrical system provides low voltage (12 VDC) electric power for external control/interlock switch closures to remotely or automatically actuate the purifier blower motor. The 12 volt supply is also designed to shield itself and prevent the emission of EMI/RFI noise.

The 1230-4-17 Power Supply is continuously powered once the SpectraPure Air Purifier is installed and electric power is supplied to enable STANDBY mode - see Section 4.2.1. The 1230-4-17 is warranted for two years continuous operation and features a highly reliable mean time between failure of several years operation. Should servicing be necessary, contact the manufacturer for servicing instructions.

5.3 – P/N 10036 FILTER ELEMENT

The P/N 10036 Filter Element is design certified to SGI std. E-130-5/96 and is specifically designed to react quickly to and absorb halogens acid gases. The P/N 10036 Filter features a large cross section (475 in^2, or 3000cc^2) for high flow rates and very low pressure drop (> 1 in. H_2O @ STP W.G.). The filter consists of layered sections which are intended for particle removal, as well as absorption of gases. Figure 5.3.1 illustrates the layers of the assembly.

FIGURE 5.3.1 – P/N 10036 FILTER ELEMENT



ITEM	DESCRIPTION
1.	Coarse pre-filter.
2.	Activated charcoal bed.
3.	Fine particle filter.

The P/N 10036 Filter should be oriented inside the purifier so that the flow direction arrows on the filter label point upwards. The filter label should be visible from the front of the purifier when the Front Service Panel is removed.

The P/N 10036 is shipped from the factory wrapped in plastic to prolong the useful life of the filter element. The P/N 10036 is nominally rated for 3 years shelf life and should be replaced as indicated on the filter label. Replacement filter elements and servicing instructions are available from Spectra Gases, Inc.

5.4 – STEPDOWN TRANSFORMER (220/240 VAC VERSION ONLY)

In order to operate the SpectraPure 5300 Air Purifier on 220/240 VAC, 50 or 60 Hz., the unit is factory equipped with a stepdown transformer that converts line voltage to 110 VAC for internal SpectraPure Purifier components. See Figure 7.3.

SECTION 6 – MAINTENANCE AND TROUBLESHOOTING

6.1 – SUMMARY

The SpectraPure 5300 Air Purifier requires little or no maintenance once it is properly installed. Most components are rated for several years of use. Should special servicing become necessary, contact the factory for parts and written servicing instructions. This section provides instructions for routine maintenance and troubleshooting.

CAUTION: Risk of electric shock. Service access panels should be removed only by qualified servicing personnel.

6.2 – MAINTENANCE

The P/N 10036 Filter Element in the purifier should be replaced every three years to assure a high rate of performance. The replacement procedure is the same procedure as the installation procedure described in Section 3.2. Replacement filter elements are available from the factory.

The SpectraPure 5300 Air Purifier requires no other routine maintenance.

6.3 – TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	REMEDY
Red LED panel light on control panel is not - "ON".	MAIN Power Switch is not turned - "ON".	Turn MAIN Power Switch on back panel of SpectraPure into - "ON" position. Leave "ON" in STANDBY at all times except when installing or servicing purifier.
	Wall voltage supply is not - "ON".	In order to correctly install the purifier, wall voltage outlet supply should be "ON" at all times, and should be independently wired from any ON/OFF wall switches.
	Fuse(s) has (have) blown.	Check fuse, check for shorts and replace if necessary.
	12 VDC Power Supply in SpectraPure Purifier has burned out.	Contact factory representative to replace Power Supply. Purifier safety interlocks will not be enabled without 12 VDC Power Supply fully functioning.
Blower motor will not turn - "ON", when control panel Power Switch is turned - "ON".	Wall voltage supply is turned - "OFF".	See Remedy listed above.
	MAIN Electrical Power Switch is not turned - "ON".	See Remedy listed above.
	Automatic Thermal Overload Sensor in blower motor has tripped.	**WARNING:** Blower blades may be blocked. Allow 10 - 15 minutes to cool motor. If this is effective in starting motor, contact factory for further assistance if symptoms re-occur.
Blower motor will not turn "ON" when interlock switches are closed.	Interlocks not wired properly.	Correct faulty installation - see Sections 3.6 and 3.7.
	12 VDC Power Supply has burned out.	See Remedy listed above.
Air flow seems low.	Intake or exhaust vents are obstructed, or insufficient clearance is available near the vents.	**WARNING:** Do not obstruct intake or exhaust vents. Make sure adequate clearance is provided. See Section 3.3.
No air flow observed.	Power is not "ON".	Check Control Panel LED light to make sure voltage is being supplied to the SpectraPure.
	Flow may be completely obstructed by plastic shipping wrapper on SpectraPure Filter Element.	See Section 3.2. Remove plastic shipping wrapper from P/N 10036 Filter Element.
SpectraPure vibrates or seems noisy.	Noise may be normal, (≈ 85 db). Unit may not be level, or rubber mounting feet not properly installed. Loose hardware or possible shipping damage.	Check to make sure unit is level and properly installed. Check for signs of possible shipping damage as soon as unit is received. See page iii at the front of this manual.

SECTION 7 – SPECIFICATIONS AND SCHEMATICS

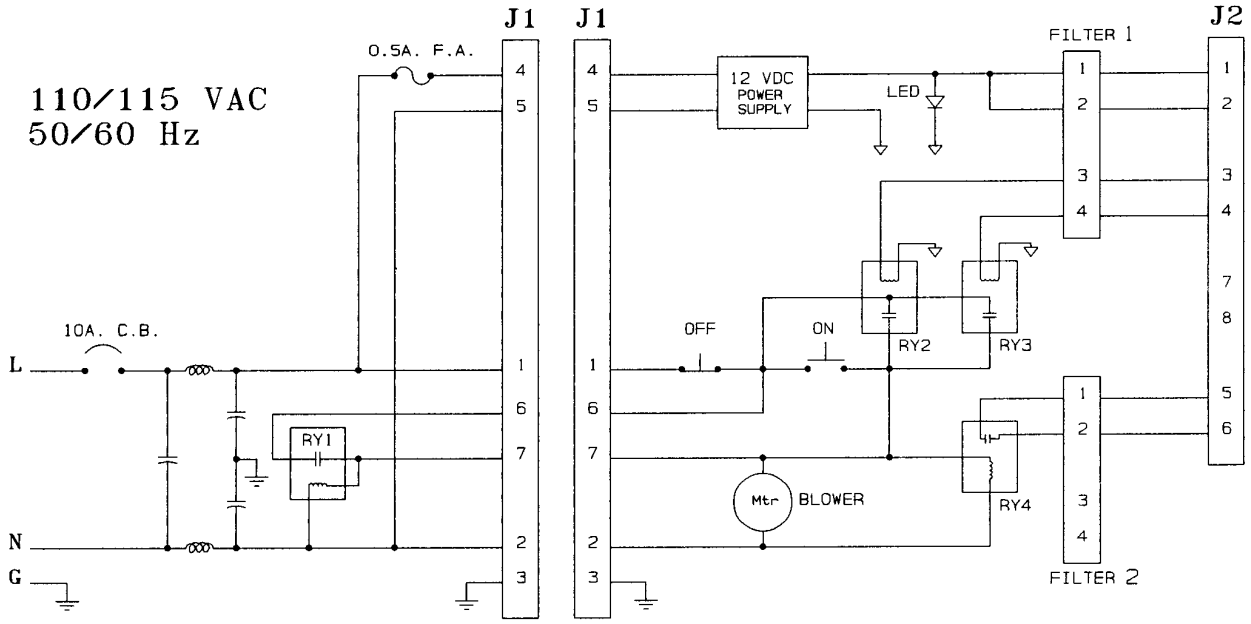
7.1 – AIR PURIFIER TABLE OF SPECIFICATIONS

Circulation Air Flow Rate:	1000 CFM – 60 Hz. 850 CFM – 50 Hz. (assumes no obstructions to flow)
P/N 10036 Filter Element Process Capacity:	Factory tested and certified to purify entire contents of #3 SGI gas cylinder containing medical excimer laser gas mix.
Power Requirements:	110/115 VAC, 50/60 Hz, Single Phase, 10 Amps – or – 220/240 VAC, 50/60 Hz, Single Phase, 6 Amps.

	110 VAC Version	220 VAC Version
Gross Shipping Weight: (without Gas Detector) kgs.	150 lbs., 70 kgs.	175 lbs., 80
Net Weight: (with P/N 10036 Filter Element)	115 lbs., 50 kgs.	140 lbs., 65 kgs

Weight of P/N 10036 Filter Element:	18 lbs., 8 kgs.
Dimensions:	35" (88 cm) H x 25" (64 cm) W x 24" (61 cm) D.
Standards and Ratings:	Designed to U.S. NEC, IEC, and IBM C-P-3-0502-202 1988-12. Performance certified to SGI E-130-5/96. Safety tested to UL-544. Listed Air Purifier 427A. U.S. and Canada. Risk Class 1. Std. 125. Safety tested to European CE: EN 60335-1, EN 60335-2-65, EN 50081-1, EN 50082-1:92.

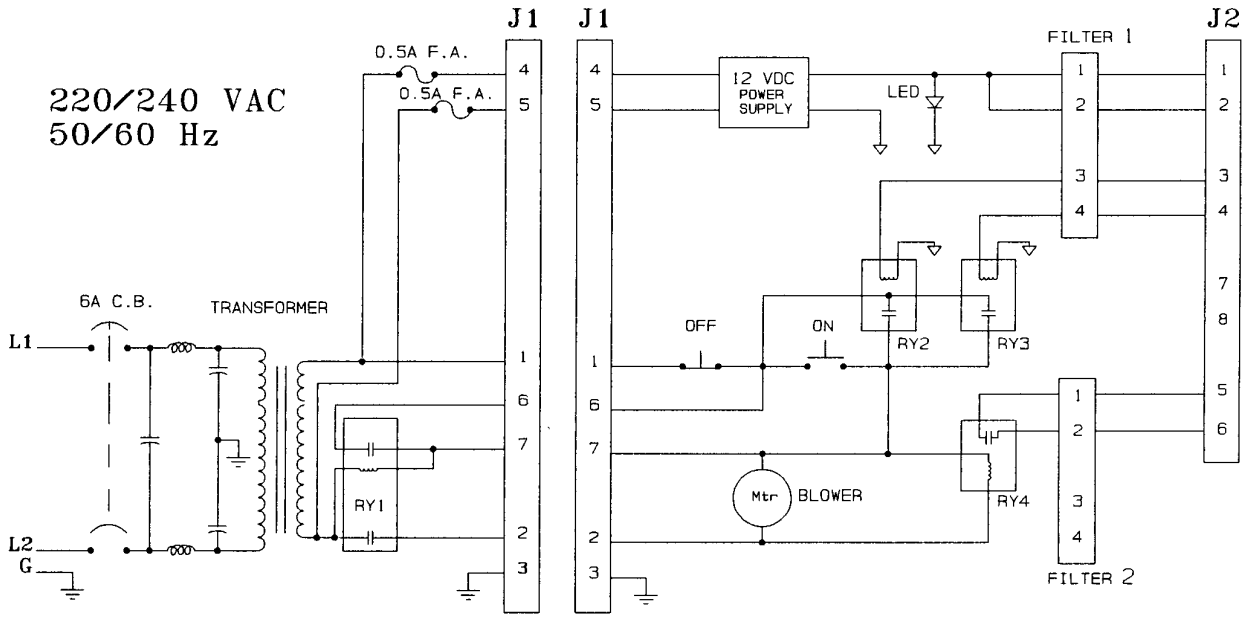
7.2 - AIR PURIFIER ELECTRICAL SCHEMATIC/110 VAC



RELAY	FUNCTION	J2 PIN#
RY1	Switches line voltage to the blower motor.	No Conn.
RY2	For interlock to Remote Start Button.	1.3
RY3	For optional interlock to Gas Detector.	2.4
RY4	For optional signal.	5.6

I/O CONN.#	DESCRIPTION
J1	Internal connector for VAC. power. Option for 110 or 220 VAC.
J2	Interlock back panel 9 pin Amp connector.

7.3 - AIR PURIFIER ELECTRICAL SCHEMATIC/220 VAC



RELAY	FUNCTION	J2 PIN#
RY1	Switches line voltage to the blower motor.	No Conn.
RY2	For interlock to Remote Start Button.	1.3
RY3	For optional interlock to Gas Detector.	2.4
RY4	For optional signal.	5.6

I/O CONN.#	DESCRIPTION
J1	Internal connector for VAC. power. Option for 110 or 220 VAC.
J2	Interlock back panel 9 pin Amp connector.

7.4 – AIR PURIFIER CONTROL LOGIC TABLE

BLOWER	MASTER BREAKER	LOCAL POWER	REMOTE START	F_2 DETECTOR (OPTION)	AUXILIARY OUTPUT
OFF	OFF	OFF	OFF	OFF	OFF
OFF	ON	OFF	OFF	OFF	OFF
ON	ON	ON	OFF	OFF	ON
ON	ON	ON	OFF	ON	ON
ON	ON	ON	ON	OFF	ON
ON	ON	ON	ON	ON	ON